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Dated 16 June 2004



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The Patent Office

Cardiff Road  
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1. Your reference

CDK2145

2. Patent application number

(The Patent Office will fill in this part)

0328388.4

08DEC03 E857894-i D00208  
01/7700 0.00-0328388.43. Full name, address and postcode of the or of each applicant (*underline all surnames*)RHODIA CONSUMER SPECIALTIES LIMITED  
Oak House, Reeds Crescent, Watford,  
Hertfordshire, WD24 4QP,Patents ADP number (*if you know it*)

7870322006

If the applicant is a corporate body, give the country/state of its incorporation

England

4. Title of the invention

UNCOUPLING AGENT

5. Name of your agent (*if you have one*)

Barker Brettell

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)138 Hagley Road  
Edgbaston  
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B16 9PWPatents ADP number (*if you know it*)

7442494002

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Country

Priority application number  
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Date of filing  
(day/month/year)Is a statement of inventorship and of right to grant of a patent required in support of this request (*Answer 'Yes' if:*

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
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Description 3 + 3

Claim(s) -

Abstract -

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Priority documents -

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination (*Patents Form 9/77*) -

Request for substantive examination (*Patents Form 10/77*) -

Any other documents -  
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Barker Brettell  
Barker Brettell

Date

05 December 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Lucy P. Trueman

Tel: 0121 456 1364

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## UNCOUPLING AGENT

This invention relates to uncoupling agents for use in the control of bacterial biomass in aqueous systems, to the use of such agents and to a  
5 method of using such an agents.

Bacterial biomass (sludge) produced during the treatment of waste water is costly to dispose of. Hitherto, organic chemical compounds have been shown to act as "uncoupling agents" to reduce the generation of bacterial  
10 biomass by uncoupling a proton gradient across the plasma membrane of bacteria. The proton gradient is generated as nutrient is consumed and is then used *inter alia* to generate ATP (adenosine triphosphate) via oxidative phosphorylation. The ATP may then be used, by the bacteria, to generate more biomass. Uncoupling of the proton gradient causes  
15 reduced ATP synthesis. Reduced ATP synthesis results in a reduced rate of growth of biomass.

However, the aforementioned uncoupling agents are usually phenolic products and are unsuitable for use in aqueous systems due to high  
20 toxicity.

The present invention provides novel uncoupling agents with low toxicity to aqueous systems.

25 Accordingly, the present invention, in a first aspect, provides an uncoupling agent comprising a water treatment biocide, wherein the biocide is preferably selected from the group consisting of aldehydes, quaternary ammonium salts, quaternary phosphonium salts, activated-halogen containing compounds, heterocyclic N,S compounds and  
30 carbamates.

The uncoupling agent according to the first aspect of the present invention may be formulated with at least one of the following:

- a surfactant;
- 5 an antifoam,
- a scale inhibitor;
- a corrosion inhibitor;
- another biocide; and
- a dispersant.

10

Preferably, the aldehyde is glutaraldehyde.

Examples of suitable quaternary ammonium salts are dodecyl trimethyl ammonium chloride, cetyltrimethylammonium bromide and

15 benzalkonium chloride

Preferably, the quaternary phosphonium salt is tetradecyl tributyl phosphonium chloride

20 Examples of suitable activated-halogen containing compounds are dibromonitrilopropionamide and 2-bromo-2-nitro-propan-1,3-diol.

Examples of suitable heterocyclic N,S compounds are 5-chloro-2-methyl-3(2H)-isothiazolone and 5-chloro-2-methyl-4-isothiazolin-3-one.

25

An example of a suitable carbamate is sodium N-dimethyldithiocarbamate

The present invention also provides, in a second aspect, the use of an effective amount of an uncoupling agent as defined in the first aspect of  
30 the present invention to control bacterial biomass in an aqueous system.

Preferably, the aqueous system is an industrial or municipal wastewater treatment plant. Such a plant typically takes in wastewater from industrial processes (e.g. paper production, food processing, chemical industry) and/or domestic and institutional habitations and the like and, 5 by using micro-organisms in aerobic and/or anaerobic processes, to consume organic contaminants and render the water fit for re-use or discharge into the environment.

The effective amount of said uncoupling agent is preferably between 1 10 and 10,000 milligrams per gram of sludge solids in the wastewater treatment process.

The present invention further provides, in a third aspect, a method for controlling the growth of bacterial biomass in a wastewater treatment 15 plant comprising adding to, or contacting with, said wastewater with an effective amount of an uncoupling agent according to the first aspect of the invention.

The effective amount of the uncoupling agent is preferably between 1 and 20 10,000 milligrams per gram of sludge solids in the wastewater treatment process.